AMENDMENTS TO THE CLAIMS

This is a complete and current listing of the claims, marked with status identifiers in parentheses. The following listing of claims will replace all prior versions and listings of claims in the application.

1. (Previously Presented) A computer-readable recording medium, comprising:

an information area, the information area including a first region for a main data, and a second region for control information required for recording or reproduction of the main data and a bi-phased modulation data required for reproducing the control information or the main data, said control information being encoded as wobble pits,

wherein the bi-phased modulation data is recorded along with a wobble pattern of the wobbled pits in such a manner that bit 0 and bit 1 are determined respectively depending on a direction of a transition of the wobble pattern within a predetermined period,

wherein one of the bit 0 and the bit 1 is represented by only one transition from high to low in a middle within the predetermined period and another one is represented by only one transition to an opposite direction in the middle within the predetermined period.

2. (Previously Presented) The recording medium according to claim 1, wherein said control information is recorded in a lead-in zone of the information area of the recording medium.

3. (Cancelled)

4. (Previously Presented) The recording medium according to claim 2, wherein said control information is recorded in a permanent information & control (PIC) data area of the lead-in zone.

5. (Previously Presented) The recording medium according to claim 4, wherein the bit 0 is represented by the transition from low to high in the middle within the predetermined period, while the bit 1 is represented by the transition from high to low in the middle within the predetermined period.

6. (Previously Presented) The recording medium according to claim 1, wherein said control information is recorded in a permanent information & control (PIC) data area of the information area as part of disc information or independent of the disc information.

7. - 13. (Cancelled)

14. (Previously Presented) The recording medium according to claim 1, wherein the information area further includes a third region for storing identification information to identify the presence or absence of the control information, said identification information is encoded in wobbled pattern by bi-phase modulation.

15. (Previously Presented) A method of forming a recording medium, comprising:

forming a first region for storing a main data;

forming a second region for control information required for recording or reproduction of the main data and a bi-phased modulation data required for reproducing the control information or the main data; and

encoding the control information as wobble pits,

wherein the bi-phased modulation data is recorded along with a wobble pattern of the wobbled pits in such a manner that bit 0 and bit 1 are determined respectively depending on a direction of a transition of the wobble pattern within a predetermined period, and wherein one of the bit 0 and the bit 1 is represented by only one transition from high to low in a middle within the predetermined period and another one is represented by only one transition to an opposite direction in the middle within the predetermined period.

16. (Previously Presented) The method according to claim 15, wherein said second region for said control information is in a lead-in zone of the information area of the recording medium.

17. (Cancelled)

18. (Cancelled)

19. (Currently Amended) The method according to claim [[18]] 15, wherein the bit 0 is represented by the transition from low to high in the middle within the predetermined period, while the bit 1 is represented by the transition from high to low in the middle within the predetermined period.

20. (Previously Presented) The method according to claim 15, wherein said second region for said control information is in a permanent information & control (PIC) data area of the information area as part of disc information or independent of the disc information.

21. - 27. (Cancelled)

28. (Previously Presented) The method according to claim 15, further comprising:

forming a third region for identification information to identify the presence or absence of the control information,

wherein said identification information is encoded in wobbled pattern by bi-phase modulation.

29. (Previously Presented) A method of reproducing data from a recording medium, comprising:

utilizing control information required for reproduction of a main data, to reproduce the data and a bi-phased modulation data required for reproducing the control information or the main data, the control information being encoded as wobbled pits wherein the bi-phased modulation data is recorded along with a wobble pattern of the wobbled pits in such a manner that bit 0 and bit 1 are determined respectively depending on a direction of a transition of the wobble pattern within a predetermined period, wherein one of the bit 0 and the bit 1 is represented by only one transition from high to low in a middle within the predetermined period and another one is represented by only one transition to an opposite direction in the middle within the predetermined period, and

wherein the utilizing step includes a step of decoding the control information by a demodulation method.

30. (Previously Presented) The method according to claim 29, wherein said control information is recorded in a lead-in zone of the information area of the recording medium, and

wherein the utilizing step includes a step of reading the control information in the lead-in zone.

31. (Cancelled)

32. (Previously Presented) The method according to claim 30, wherein said control information is recorded in a permanent information & control (PIC) data area of the lead-in zone, and

wherein the reading step reads the control information in the PIC data area.

33. (Previously Presented) The method according to claim 32, wherein the bit 0 is represented by the transition from low to high in the middle within the predetermined period, while the bit 1 is represented by the transition from high to low in the middle within the predetermined period, and

wherein the decoding step decodes the bit 0 or 1 by identifying the transition direction.

34. (Previously Presented) The method according to claim 29, wherein said control information is recorded in a permanent information & control (PIC) data area as part of disc information or independent of the disc information, and

wherein the utilizing step includes a step of reading the control information as part of disc information or independent of the disc information.

35. - 41. (Cancelled)

42. (Previously Presented) The method according to claim 29, wherein the utilizing step includes a step of utilizing identification information to identify the presence or absence of the control information, said identification information being encoded in wobbled pattern by bi-phase modulation.

43. - 56. (Cancelled)

57. (Previously Presented) An apparatus for reproducing data from a recording medium, comprising:

a signal detector to detect control information required for reproduction of a main data, to reproduce the data, and a bi-phased modulation data required for reproducing the control information or the main data, the control information being encoded as wobble pits, wherein the bi-phased modulation data is recorded along with a wobbled pattern of the wobbled pits in such a manner that bit 0 and bit 1 are determined respectively depending on a direction of a transition of the wobble pattern within a predetermined period, wherein one of the bit 0 and the bit 1 is represented by only one transition from high to low in a middle within the predetermined period and another one is represented by only one transition to an opposite direction in the middle within the predetermined period; and

a signal processor, coupled to the signal detector, to decode the control information by a demodulation method.

58. (Previously Presented) The apparatus according to claim 57, wherein said control information is recorded in a lead-in zone of the information area of the recording medium, and wherein the signal detector detects the control information in the lead-in zone.

59. (Cancelled)

60. (Previously Presented) The apparatus according to claim 58, wherein said control information is recorded in a permanent information & control (PIC) data area, and

wherein the signal detector detects the control information in the PIC data area.

61. (Previously Presented) The apparatus according to claim 60, wherein the bit 0 is represented by the transition from low to high in the middle within the predetermined period, while the bit 1 is represented by the transition from high to low in the middle within the predetermined period, and

wherein the signal processor decodes the bit 0 or 1 by identifying the transition direction.

62. (Previously Presented) The apparatus according to claim 57, wherein said control information is recorded in a permanent information & control (PIC) data area as part of disc information or independent of the disc information,

wherein the signal detector detects the control information as part of disc information or independent of the disc information.

63. - 69. (Cancelled)

70. (Previously Presented) The apparatus according to claim 57, wherein the signal processor identifies the presence or absence of the control information based on identification information, said identification information being encoded in wobbled pattern by bi-phase modulation.

71. (Previously Presented) The recording medium according to claim 1, wherein the control information is reproducible only when the bi-phased modulation data is detected normally.

72. (Previously Presented) The recording medium according to claim 1, wherein the main data is reproducible only when the control information is reproduced by the bi-phased modulation data.

73. (Previously Presented) The method according to claim 15, wherein the control information is reproducible only when the bi-phased modulation data is detected normally.

74. (Previously Presented) The method according to claim 15, wherein the main data is reproducible only when the control information is reproduced by the bi-phased modulation data.

75. (Previously Presented) The method according to claim 29, wherein the control information is reproducible only when the bi-phased modulation data is detected normally.

76. (Previously Presented) The method according to claim 29, wherein the main data is reproducible only when the control information is reproduced by the bi-phased modulation data.

77. (Previously Presented) The apparatus according to claim 57, wherein the control information is reproducible only when the bi-phased modulation data is detected normally.

78. (Previously Presented) The apparatus according to claim 57, wherein the main data is reproducible only when the control information is reproduced by the bi-phased modulation data.

<End of Claims Listing>